



MITIGATION OF TSUNAMI DISASTERS IN PORTS

Terms of Reference

1 Background

Since the well-received publication of the original MarCom WG 112 report in 2010, rising global awareness of tsunami-related hazards exacerbated by occurrence of disastrous tsunamis of the 21st century has resulted in significant advancements within virtually all realms of the relevant scientific, technological, environmental and societal knowledge to-date.

Dedicated to the tsunami caused by the Great East Japan Earthquake in 2011, another report by MarCom WG 122 was published in 2014 to address the rapid developments on the topic, to be consulted as an appendix to the earlier WG 112 report.

As a result of the on-going progress of the state of knowledge considering the wide-ranging topics treated in the original comprehensive WG 112 publication, this updated report will be created following the same general scope while drawing upon notable new developments.

2 Objective

The objective of the present terms of reference is to review, update and where appropriate expand or revise the original WG 112 WG 122 reports in order to incorporate the results of recent applicable scientific and technological advancements with the aim of mitigating the associated risks. The new WG may also consider pointing out good practices learned from responding to past disastrous events concerning societal and environmental impacts.

3 Matters to be investigated

To replace the WG 112 report, the WG will undertake a comprehensive search to consider relevant new developments, whereby the following recent developments are also to be noted to the extent deemed appropriate by the new WG:

- Seismology advances related to tsunami modeling and forecasting;
- advanced numerical modelling techniques including movement of vessels and onshore objects, utilizing high performance computing technologies;
- remote-sensing technology to aid both tsunami modelling and forecasting;
- early and real time warning systems developments;
- probabilistic Tsunami Hazard Analysis (PTHA);

- combined tsunami and seismic hazards;
- new design philosophy suggestions such as 'design for reconstruction';
- new specific design criteria, for instance for the improved resilience of rubble-mound breakwaters;
- non-seismic generated tsunamis, including the so-called meteo-tsunamis, affecting certain areas of the globe deemed previously immune from tsunami impact and inundation; and
- post-tsunami reconstruction and restoration issues related to urban planning & settlements relocation, socio-economic redevelopment policy, coastal ecosystems and agricultural redevelopment plus pollution assessment, and resulting psychological impacts on a grand scale.

4 Method of approach

- Collate and review pertinent developments in published and ongoing research;
- coordinate with MarCom WG 225 on seismic design guidelines for port structures; and
- review and update the MarCom WG 112 guidelines for mitigation of tsunami disasters in ports.

It is planned that the new Working Group will complete its work within 2 years.

5 Documents to be Reviewed

The following manuscripts and their references are to be considered by the Working Group:

- WG 112, 2010 - Mitigation of tsunami disasters in ports;
- WG 122, 2014 - Tsunami disasters in ports due to the great east Japan earth-quake;
- WG 34, 2001- Seismic design guidelines for port structures;
- Technical Standards and Commentaries for Port and Harbour Facilities in Japan (2020)" (<http://ocdi.or.jp/en>);
- ASCE 7 (Chapter 6), 2016 - Standard minimum design loads and associated criteria for buildings and other structures.

The new WG will also review other pertinent recent publications.

6 Intended Product

The intended product is a new comprehensive PIANC set of guidelines and recommendations to replace the WG 112 and WG 122 reports as a summary of the state-of-the-art in mitigating tsunami risks in ports.

7 Working Group Membership

Working group membership should include:

- Seismologists and seismic engineers working in related fields;
- tsunami research experts including numerical modelers, etc.;
- hydraulic engineers with relevant experience;
- port and coastal engineers and academics;
- breakwater designers and researchers;
- marine structural engineering experts;

- remote Sensing experts with experience pertinent to tsunami modelling and forecasting; and
- WG 225 link to be established for coordination.

To partake of the global expertise, contributions from the following sources of acclaimed publications are invited:

- Port and Airport Research Institute (PARI) of Japan;
- APEC Cooperation for Earthquake Simulation (ACES)(<http://www.aces.org.au/>),
- Intergovernmental Oceanographic Commission (IOC)'s Tsunami Programme.

8 Relevance to Countries in Transition

The guidelines will be of significant value to those countries in transition which are deemed in peril of potentially catastrophic tsunami events, and will increase awareness and assist planning and the provision of timely actions to mitigate the effects of such occurrences from both human and economic perspectives.

For instance, the Makran Subduction Zone (MSZ) directly affects the countries of Pakistan, Iran, Oman, UAE and India and is the subject of an ongoing multi-national study by IOC:

http://www.ioc-tsunami.org/index.php?option=com_content&view=article&id=389&Itemid=354&lang=en

Due to this relevance, it is suggested that the MSZ and similar specific sources worldwide be also treated within the context of the new report.

9 Climate Change Considerations

No specific climate change considerations are intended for incorporation in the resulting manuscript.

10 Relevance to UN Sustainable Development Guidelines

This report will be of relevance to the 'Industry, Innovation and Infrastructure Goal (SDG9)', by helping to safeguard port infrastructure investments from potentially devastating events. Moreover, through providing access to science, technology and innovation and enhancing knowledge sharing, the 'Partnerships to achieve the Goal (SDG17)' is well-served.